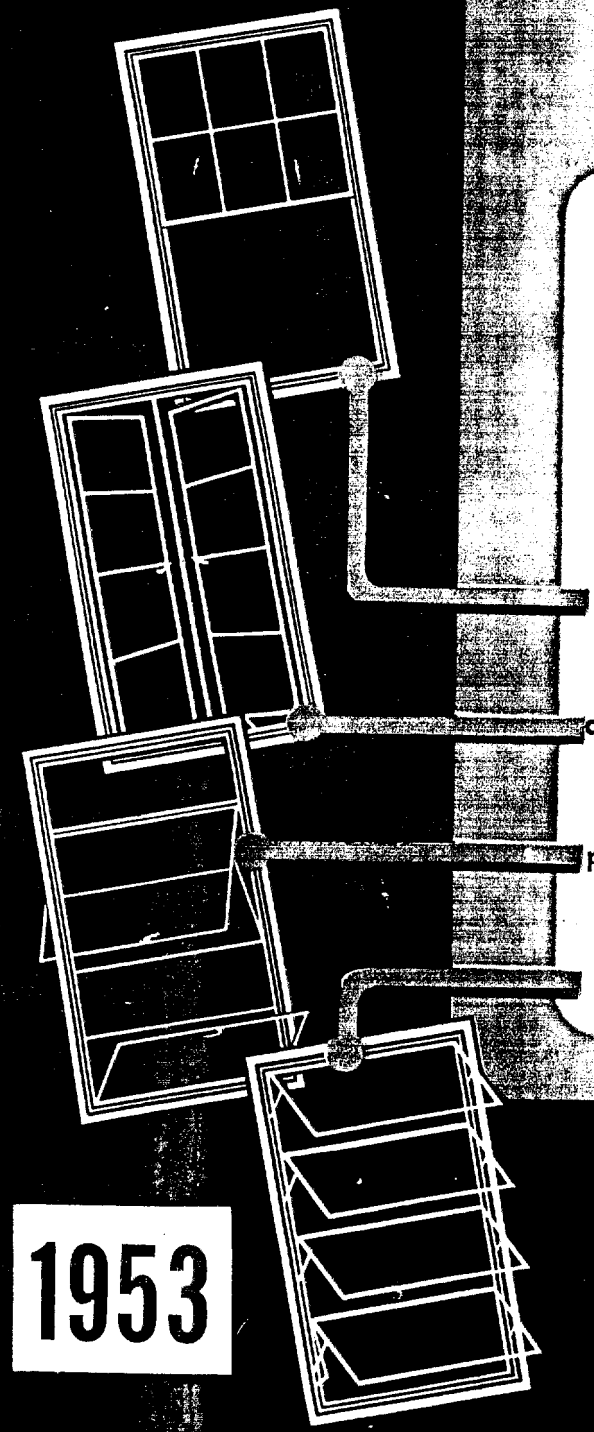
QUALITY APPROVED

ALUMINUM WINDOWS

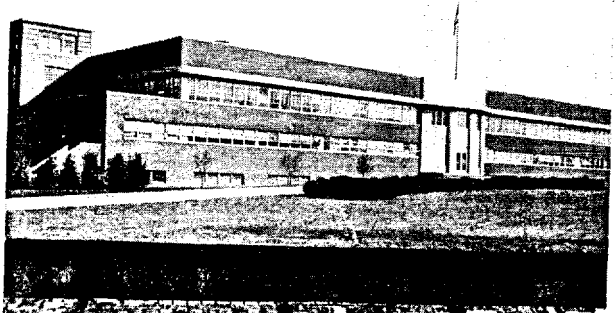
SPECIFICATIONS



1953

ALUMINUM WINDOW MANUFACTURERS ASSOCIATION

74 Trinity Place • New York 6, N. Y.



What

the "quality - approved" seal means to the building industry

The "Quality-Approved" Seal is a mark of quality. It assures windows (double-hung, casement, projected or awning types) that meet the rigid specifications of the Aluminum Window Manufacturers Association.

These specifications and minimum structural standards covering quality of materials, construction, strength of sections and minimum air infiltration requirements were established by the Association for the protection of all who specify, buy or use aluminum windows. That's why you should always insist on "Quality-Approved" aluminum windows when you are specifying windows.

Use of the "Quality-Approved" Seal is *not* limited to members of the Association. Any manufacturer—whether a member of the Association or not—whose windows when tested by the independent Pittsburgh Testing Laboratory, meet these minimum standards can qualify for use of the "Quality-Approved" Seal.

The "Quality-Approved" Seal, featuring the copyrighted emblems of the Aluminum Window Manufacturers Association and of the Pittsburgh Testing Laboratory, is the joint guarantee of the Association and of the Laboratory, *first* (on the part of the Association) that these minimum specifications constitute the best judgment and experience of many years of responsible aluminum window manufacture and that if followed in letter and spirit will insure a worthy product, and *second* (on the part of the Laboratory) that a sample of particular window on which the "Quality-Approved" Seal is displayed, did, in fact, meet or exceed these exacting requirements. Unauthorized use of the "Quality-Approved" Seal will be prosecuted. Its use will be authorized impartially and scrupulously in the public interest to all who comply with the rules and regulations as published by the Association and the Pittsburgh Testing Laboratory, jointly, and whose products are found to fulfill these specifications. For clients' protection, specify windows that carry the "Quality-Approved" Seal.

Aluminum Window Manufacturers Association

HERBERT S. BLAKE, JR., SECRETARY

74 TRINITY PLACE, NEW YORK 6, N. Y.

FOR STRENGTH OF SECTIONS

Specify aluminum windows and give your clients all these advantages . . .

For schools, for hospitals, for commercial, monumental and industrial buildings, and for residential buildings, both large and small—aluminum windows offer many outstanding advantages—advantages that will be appreciated by your clients—enhance his building investment.

NEVER NEED PAINTING

Aluminum windows will not rust-streak or rot. They are not subject to attack by termites. They never need to be painted. This means a continuous saving, year after year, that in many cases soon exceeds the original cost of the windows themselves.

LOW MAINTENANCE

Aluminum windows require practically no maintenance, no painting, no replacements—ever. Aluminum windows are easy to maintain and keep clean. Wiping them with a damp cloth occasionally is sufficient.

GOOD LOOKS

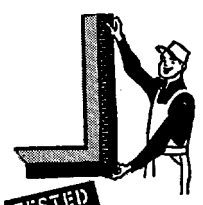
The smart, trim appearance, narrow frames, increased glass areas of modern aluminum windows add to the attractiveness of any structure. They harmonize with almost any style of architecture and their clean, neutral color blends with any color scheme.

EASE OF OPERATION

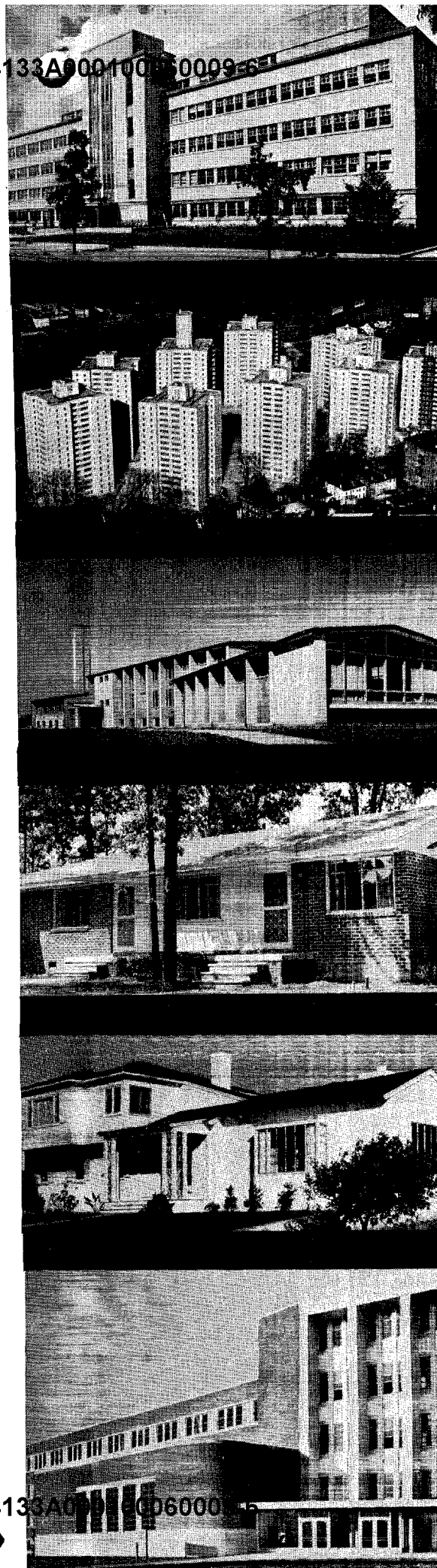
Aluminum windows always open easily—close tightly. They cannot warp, swell or stick. They will never be "painted shut."

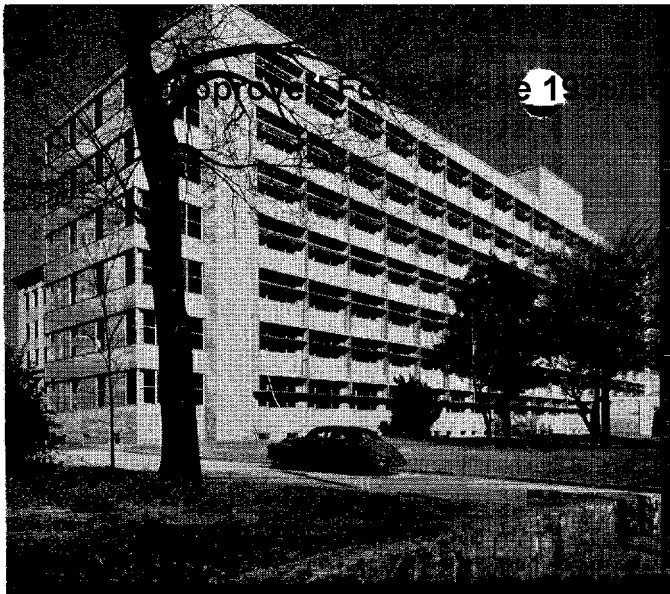
YEARS OF TROUBLE-FREE SERVICE

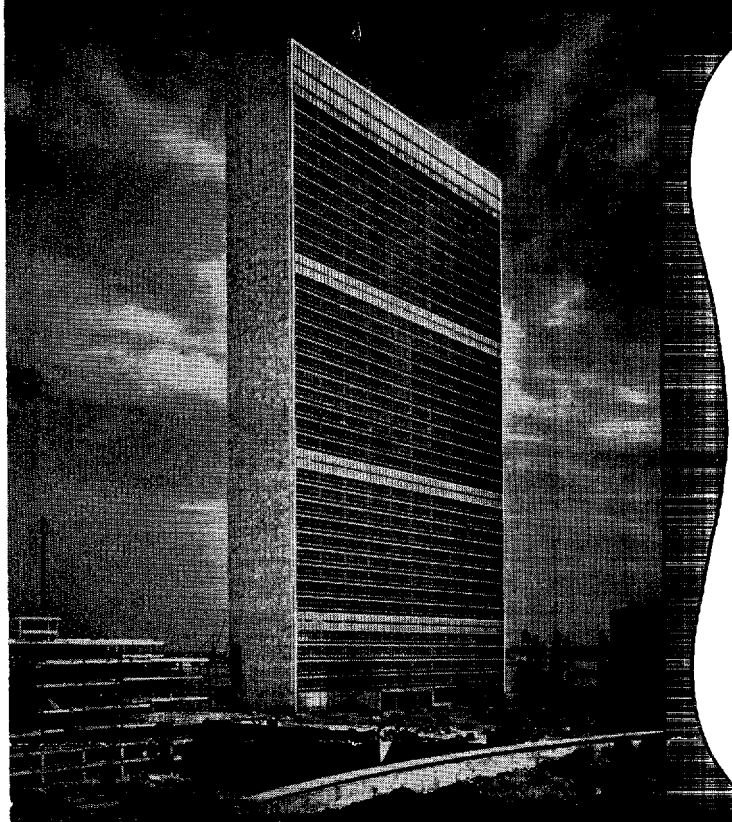
"Quality-Approved" aluminum windows are made from strong aluminum sections that will not wear out or need replacement. Hardware and all moving parts are rigid and strong.



Indiana State Board of Health, Indianapolis, Ind.
Architects: Leonard & Mathews





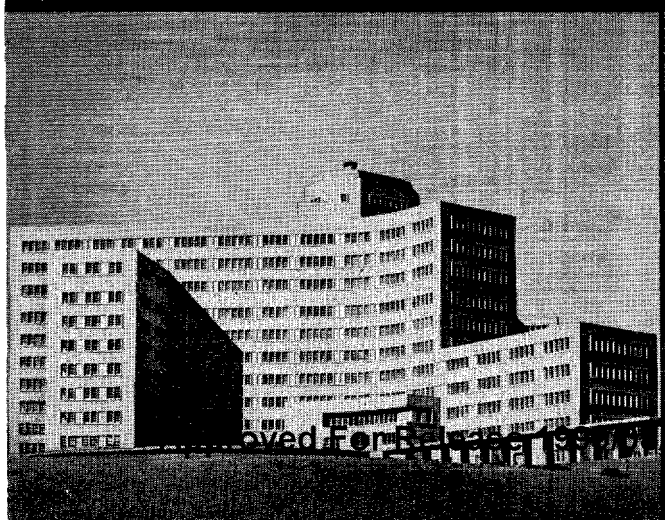


How to use these specifications

In an endeavor to simplify the writing of specifications for "Quality-Approved" aluminum windows the Technical Committee of the Aluminum Window Manufacturers Association offers a short form specification as well as a complete master specification in two parts.

Use of the short form specification is recommended wherever possible. It may be used for any type of aluminum window by merely inserting the specific type or types ordered. The short form specification will save you time, while assuring full compliance on the part of the bidder with the complete detailed specification.

Where a complete detailed specification is required copy Section 1 in full. Then, follow with the specific portion of Section 2 that covers the type of windows required.



Specifications

ALUMINUM WINDOWS

short form specification

NOTE: The following is a short form specification covering aluminum windows:

All aluminum windows of the types and sizes shown on the drawings and to be furnished under this contract shall be manufactured by ..... or..... or equal to conform to all requirements for "Quality-Approved" aluminum windows in the Aluminum Window Manufacturers Association Master Specification (choose the applicable designation(s) from the following:)

DH-A1—Double-Hung (and Single-Hung) Windows for Residential-Type Buildings

DH-A2—Double-Hung (and Single- and Triple-Hung) Windows for Commercial-Type Buildings

DH-A3—Double-Hung (and Single- and Triple-Hung) Windows for Monumental-Type Buildings

C-A1—Casement Windows for Residential-Type Buildings

C-A2—Casement Windows for Commercial-Type Buildings

C-A3—Casement Windows for Monumental-Type Buildings

P-A1—Projected Windows for Residential-Type Buildings

P-A2—Projected Windows for Commercial- and Monumental-Type Buildings

A-A1—Awning Windows for Residential-Type Buildings

A-A2—Awning Windows for Commercial- and Monumental-Type Buildings

as published in Sweet's File, Architectural, latest edition, and available from the Aluminum Window Manufacturers Association, 74 Trinity Place, New York 6, N. Y. Erection, glass, glazing clips, glazing compound, glazing, caulking compound, caulking, grouting and cleaning-after-erection shall be by others.

master specification

NOTE: To form a complete specification to cover aluminum windows of one or more types which you desire for your requirements use Section 1 in its entirety and combine with it one or more of the following portions of Section 2:

SPECIAL NOTE: *In cooperation with the U. S. Government and in accordance with restrictions imposed by government regulations covering the use of scarce materials, specific exceptions to these specifications have been allowed by the Aluminum Window Manufacturers Association. These exceptions involve only the use of approved substitute accessory materials and in no way affect the specifications as they pertain to construction or performance requirements.*

SECTION 1

NOTE: This section contains the general requirements applicable to all aluminum windows and is to be used in conjunction with Section 2.

1.1 GENERAL AND SCOPE

All aluminum windows of the types and sizes shown in the plans and/or as called for in this specification shall be furnished with all necessary hardware, anchors, and miscellaneous equipment as herein specified and shall be manufactured by .....or.....or equal. Erection, glass, glazing clips, glazing compound, glazing, caulking compound, caulking, grouting and cleaning after erection shall be by others.

1.2 MATERIALS

1.2.1 **Window Members.** All window members including muntin bars shall be of aluminum. Aluminum shall be of commercial quality and of proper alloy for window construction, free from defects impairing strength and/or durability. The aluminum alloy used shall contain not more than 0.4 per cent copper. Reinforcing members, if used, shall be of aluminum or non-magnetic stainless steel. Material thickness for aluminum members shall be such as to adequately perform the functions for which they are designed.

1.2.2 **Fasteners.** Screws, nuts, washers, bolts, rivets and other miscellaneous fastening devices incorporated in the windows shall be of aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with aluminum and shall be of sufficient strength to perform the functions for which they are used. Plated or coated materials are not permitted.

1.2.3 **Hardware.** Hardware having component parts which are exposed shall be of aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with aluminum and shall be of sufficient strength to perform the functions for which it is used. Plated or coated materials not compatible with aluminum are not permitted unless properly insulated from the aluminum.

1.2.4 **Weather Strip.** Weather strip where used shall be of material which is compatible with aluminum.

1.2.5 **Moving Parts.** There shall be no aluminum-to-aluminum contact between hardware parts or window members which are required to move relative to one another and at the same time remain in contact.

1.2.6 **Anchors.** All anchoring devices used in the erection of the windows shall be of aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with aluminum. Steel anchors may be used provided that they be properly insulated from the aluminum.

1.3 CONSTRUCTION

1.3.1 **Assembly.** The windows shall be assembled in a secure and workmanlike manner to perform as hereinafter specified and to assure neat, weathertight construction. A permanent watertight joint shall be made at the junction of the sill and side-frame members. Individual windows having ventilating units shall be completely assembled at the plant of the manufacturer ready for shipment as a unit, except that muntin installation may be at the factory or in the field. When welding flux is used, it shall be completely removed immediately upon completion of the welding operation.

1.3.2 **Hardware.** The hardware shall be designed to perform the functions for which it is intended and shall be securely attached to the window.

1.3.3 **Mullions.** Where multiple-unit openings occur, the individual window units shall be joined together with the manufacturer's standard vertical mullion. Where special vertical or horizontal mullions are required for architectural or structural reasons, they shall be furnished by others unless otherwise specified.

1.3.4 **Glazing.** Windows shall be designed for glazing with 1/8 inch glass unless otherwise specified. Adequate provision shall be made for use of glazing compound and, if specified, glazing beads of any material compatible with aluminum.

WINDOWS

1.4 FINISH

The exposed surfaces of all aluminum members shall be cleaned to make them reasonably uniform in color and free from serious surface blemishes. If exposed welded joints are used, they shall be dressed flush and finished to match adjacent surfaces.

1.5 PROTECTIVE COATING

1.5.1 **Windows.** A suitable protective coating shall be applied to all frame and sash members after fabrication. This applied coating on the aluminum surface must be such as to withstand the action of lime mortar for a period of at least one month in an atmosphere of 100% relative humidity at room temperature. The coating used shall be of a type to which the glazing compound will adhere. The preferred coating is a clear water-white methacrylate-type lacquer, resistant to alkaline mortar and plaster. Before application of the protective coating the manufacturer shall remove all fabrication compounds, dirt accumulations and/or steel wool fibers deposited by abrasion cleaning.

1.5.2 **Sub-Frames.** If steel sub-frames are used, all surfaces of the steel shall be insulated from direct contact with aluminum surfaces by a heavy coat of an alkali-resistant bituminous paint or a zinc-chromate primer coat or other coating suitable for this purpose. If wood sub-frames are used, the wood shall be properly treated with a preservative which will not promote corrosion of the aluminum. No part of the steel or wood sub-frame shall be left exposed on exterior of building.

1.6 AIR INFILTRATION

The manufacturer shall, when requested, furnish photostatic copies of a test made on a window identical in construction with windows being furnished under this specification. The test shall be made by a recognized testing laboratory showing that air infiltration did not exceed the applicable maximum limit as specified in Section 2 below. The amount of air infiltration shall be measured in terms of cubic feet per minute per foot of crack length when the window is subjected to a static air pressure equal to the pressure exerted by wind at a velocity of 25 miles per hour.

1.7 SCREENS

Screens, where called for, shall be of manufacturer's standard design, have aluminum or nonmagnetic stainless steel frames and be wired with 16x16 or 18x14 mesh aluminum wire cloth. The screen spline shall be aluminum or other suitable material compatible with aluminum. Assembly of the screens shall be in accordance with the construction standards set forth above. Suitable securing devices shall be furnished.

1.8 DRAWINGS and INSTALLATION DETAILS

The window manufacturer shall furnish standard details showing recommendations for the installation of the windows.

1.9 ERECTION

The erection contractor shall securely anchor windows in place to a straight, plumb and level condition, without distortion of the windows and shall make final adjustment for proper operation of ventilating units after glazing.

1.10 CAULKING

Windows shall be properly caulked by others with a suitable compound to accomplish a thoroughly weathertight installation around the perimeter of the window frame and wall opening.

1.11 GLAZING

The glazing contractor shall furnish a glazing compound which shall have a composition particularly adapted for use with aluminum windows and shall not require painting to protect it from drying out or deterioration. Any material to which the glazing compound will not readily adhere shall be removed from the glazing surfaces by the glazing contractor. If a methacrylate-type lacquer has been applied as the protective coating, it need not be removed. Glazing clips, or glazing beads if specified, shall be used with the glazing compound. The glass shall rest upon shims installed in accordance with accepted glazing procedure so that it will not rest upon any aluminum member.

1.12 CLEANING AFTER ERECTION

All exposed portions of the window shall be cleaned by others after the painting and finishing of the building is completed.

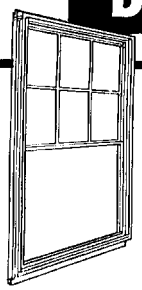
(NOTE: To complete the specification add here one or more portions of Section 2.)

SECTION 2

NOTE: This section contains the specific requirements applicable to particular types and classes of aluminum windows, and is to be used in conjunction with Section 1.

SPECIFICATION
DH-A1

DOUBLE-HUNG (and SINGLE HUNG) WINDOWS
FOR RESIDENTIAL-TYPE BUILDINGS



(Section 1 in its entirety is a part of this specification.)

2.1.1 MATERIALS

Main frame and sash members (excluding sills) shall not be less than 0.050″ in thickness. Sill members shall not be less than 0.062″ in thickness.

2.1.2 CONSTRUCTION

2.1.2.1 Cut-outs to give access to the sash balances shall be neat and closely fitted. Meeting rails shall contact tightly with each other or with weatherstrips and with wedge blocks at jambs when closed.

2.1.2.2 Where Single-Hung windows are specified they shall meet all provisions applying to Double-Hung windows except that only one sash shall be required to operate.

2.1.3 HARDWARE

The windows shall be equipped with locks and lifts of suitable non-ferrous or non-magnetic stainless steel materials. Sash shall operate freely and be equipped with balancing mechanisms or other devices which will hold both sash stationary at any open position. The mechanisms used shall be easily accessible. Balances shall be installed in the plant of the manufacturer.

2.1.4 PERFORMANCE REQUIREMENTS

2.1.4.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Test shall be of manufacturer's largest standard size, of standard construction, and at least 3′0″ wide by 5′0″ high.

A.—Horizontal Load Test. A concentrated load of 20 pounds, acting horizontally and applied at the center of the span of any horizontal sash rail assembled in the sash, shall not cause, before the sash are glazed, a horizontal deflection of more than 1/175 of its span and in no case shall the deflection exceed .219 inches.

B.—Vertical Load Test. A concentrated load of 20 pounds, acting vertically and applied at the center of the span of any horizontal rail assembled in the sash, shall not cause, before the sash are glazed, a vertical deflection of more than 1/375 of its span and in no case shall the deflection exceed .094 inches.

C.—Uniform Load Test. Under an exterior uniform load of 10 pounds per square foot no member in completely assembled window without muntins, glazed, closed and locked, continuously supported around its outside perimeter and securely anchored, shall deflect more than 1/175 of its span.

NOTE: The span length of any horizontal sash member shall be considered as equal to the overall width of the sash provided for that size of window.

WINDOWS

2.1.4.2 Air Infiltration Test

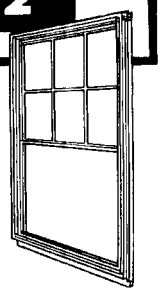
When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed ¾ cubic foot per minute per foot of crack length with sash in closed position and locked. The sash shall have been adjusted to operate in either direction with a force not exceeding 20 pounds after the sash is in motion. The nominal size of the window tested shall be 3'0" wide by 5'0" high or have a frame and integral sash perimeter equal thereto.

The following companies manufacture a DH-A1 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

All-Lite Metal Window Co., Emilie Road & Green Lane, Bristol, Pa.
Alsco, Inc., Box 270, Akron 8, Ohio *(BW series)*
Ceco Steel Products Corporation *(Sterling Aluminum Window Division)*
5601 West 26th St., Chicago 50, Ill. *(Series 50-B)*
Cupples Products Corp., 2650 So. Hanley Road, Maplewood, St. Louis 17, Mo. *(Series 200-B)*
Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. *(Lupton DH)*
General Bronze Corporation *(Alwintite Division),* Stewart Ave., Garden City, N. Y. *(Alwintite, series DHA-O)*
Metal Arts Mfg. Co., Inc., Harwell & Oakcliff Rd., Atlanta, Ga. *(Metalart, series 100-C)*
Reynolds Metals Co., (Parts Division), 2000 S. 9th St., Louisville, Ky.
J. S. Thorn Co., Allegheny Ave., Philadelphia 32, Pa. *(Metalite series)*
Windalume Corporation, Route 6, Kenvil, N. J. *(Series DH-A1)*

DOUBLE-HUNG (and SINGLE- and TRIPLE-HUNG) WINDOWS FOR COMMERCIAL-TYPE BUILDINGS

SPECIFICATION **DH-A2**



(Section 1 in its entirety is a part of this specification.)

2.2.1 MATERIALS

Main frame and sash members (excluding sills) shall not be less than 0.062" in thickness. Sill members not reinforced by sub-frames or by proper stiffening ribs shall not be less than 0.078" in thickness.

2.2.2 CONSTRUCTION

2.2.2.1 Cut-outs to give access to the sash balances shall be neat and closely fitted. Meeting rails of sliding sash shall contact tightly with each other or with weatherstrips and with wedge blocks at jambs when closed.

2.2.2.2 Where Single-Hung or Triple-Hung windows are specified they shall meet all provisions applying to Double-Hung windows except that one sash and three sash respectively shall be required to operate.

2.2.3 HARDWARE

2.2.3.1 The lower sash shall have two grips or bar lifts attached to the lower rail or shall have a continuous lift, except that for sash less than 3'0" wide between stops one grip or bar lift will be required.

2.2.3.2 When specified, the upper sash shall have two pull handles at the underside of its meeting rail, except that for sash less than 3'0" wide between stops one pull handle will be required.

2.2.3.3 Where meeting rails are over 6 feet above the finished floor, pull handles shall be omitted and the upper sash shall be provided with a pull-down socket at the inner side of its top rail for pole operation.

2.2.3.4 Unless otherwise specified, holes for shade brackets shall be omitted. If shade brackets are specified, provision for them shall be made on all windows by two clear holes, to receive self-

tapping screws, spaced 1¼ inches on center and located in the upper corner of each window, as directed by the architect. Shade brackets will be furnished and installed under another contract.

2.2.3.5 Sash shall operate freely and be equipped with balancing mechanisms or other devices which will hold sash stationary at any open position. The mechanisms used shall be easily accessible. Balances shall be installed in the plant of the manufacturer.

2.2.3.6 Unless otherwise specified, provision for window cleaner anchors shall be omitted. If window cleaner anchors are specified to be secured to the window frame, the frame shall be reinforced as may be required to receive the window cleaner anchors, and the window frames shall be anchored securely to the wall construction at the point of application of the window cleaner bolts.

2.2.4 PERFORMANCE REQUIREMENTS

2.2.4.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Tests shall be of manufacturer's largest standard size, of standard construction, and at least 4'6" wide by 7'6" high.

A.—Horizontal Load Test. A concentrated load of 30 pounds, acting horizontally and applied at the center of the span of any horizontal sash rail, shall not cause, before the sash are glazed, a horizontal deflection of more than 1/175 of its span and in no case shall the deflection exceed .250 inches.

B.—Vertical Load Test. A concentrated load of 30 pounds, acting vertically and applied at the center of the span of any horizontal sash rail, shall not cause, before the sash are glazed, a vertical deflection of more than 1/375 of its span and in no case shall the deflection exceed .160 inches.

C.—Uniform Load Test. Under an exterior uniform load of 15 pounds per square foot, no member in a completely assembled window without muntins, glazed, closed and locked, continuously supported around its outside perimeter and securely anchored, shall deflect more than 1/175 of its span.

NOTE: The span length of any horizontal sash member shall be considered as equal to the overall width of the sash provided for that size of window.

2.2.4.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed ½ cubic foot per minute per foot of crack length with sash in closed position and locked. The sash shall have been adjusted to operate in either direction with a force not exceeding 35 pounds after the sash is in motion. The nominal size of the window tested shall be 4'0" wide by 6'0" high or have a frame and integral sash perimeter equal thereto.

2.2.5 DRAWINGS and INSTALLATION DETAILS

Shop drawings shall be submitted, in triplicate for approval. Drawings will show elevations of windows, full-size sections of sash and frames, details of construction, hardware and methods of anchoring window frame in the opening.

2.2.6 GLAZING

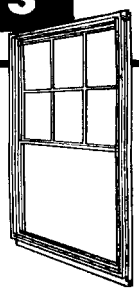
If bead glazed windows are specified, provision shall be made for the glass to be held in place by aluminum glazing beads, neatly fitted and securely attached to the sash members, and so designed that the glass may be bedded in glazing compound on both sides of the glass.

The following companies manufacture a DH-A2 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

The Adams & Westlake Company, 1102 No. Michigan, Elkhart, Ind. *(Adlake, series 500)*
Ceco Steel Products Corporation *(Sterling Aluminum Window Division),*
5601 West 26th St., Chicago 50, Ill. *(Series 150-B and 200-B)*
Cupples Products Corp., 2650 So. Hanley Road, Maplewood, St. Louis 17, Mo. *(Series 490)*
General Bronze Corp., Stewart Ave., Garden City, N. Y. *(Permatite, series DHA-3)*
Windalume Corporation, Route 6, Kenvil, N. J. *(Series DH-A2)*

DOUBLE-HUNG (and SINGLE-and TRIPLE-HUNG) WINDOWS FOR MONUMENTAL-TYPE BUILDINGS

SPECIFICATION DH-A3



(Section 1 in its entirety is a part of this specification.)

2.3.1 MATERIALS

Main frame and sash members (excluding sills) shall not be less than 0.062" in thickness. Sill members not reinforced by sub-frames or by proper stiffening ribs shall not be less than 0.094" in thickness.

2.3.2 CONSTRUCTION

2.3.2.1 Cut-outs to give access to the sash balances shall be neat and closely fitted. Meeting rails of sliding sash shall contact tightly with each other or with weatherstrips and with wedge blocks at jambs when closed.

2.3.2.2 Where Single-Hung or Triple-Hung windows are specified they shall meet all provisions applying to Double-Hung windows, except that one sash and three sash respectively shall be required to operate.

2.3.3 HARDWARE

2.3.3.1 The lower sash shall have two grips or bar lifts attached to the lower rail or shall have a continuous lift, except that for sash less than 3'0" wide between stops one grip or bar lift will be required.

2.3.3.2 When specified, the upper sash shall have two pull handles at the underside of its meeting rail, except that for sash less than 3'0" wide between stops one pull handle will be required.

2.3.3.3 Where meeting rails are over 6 feet above the finished floor, pull handles shall be omitted and the upper sash shall be provided with a pull-down socket at the inner side of its top rail for pole operation.

2.3.3.4 Unless otherwise specified, holes for shade brackets shall be omitted. If shade brackets are specified, provision for them shall be made on all windows by two clear holes, to receive self-tapping screws, spaced 1¼ inches on center and located in the upper corner of each window, as directed by the architect. Shade brackets will be furnished and installed under another contract.

2.3.3.5 Sash shall operate freely and be equipped with balancing mechanisms or other devices which will hold sash stationary at any open position. The mechanisms used shall be easily accessible. Balances shall be installed in the plant of the manufacturer.

2.3.3.6 Unless otherwise specified, provision for window cleaner anchors shall be omitted. If window cleaner anchors are specified to be secured to the window frame, the frame shall be reinforced as may be required to receive the window cleaner anchors, and the window frames shall be anchored securely to the wall construction at point of application of the window cleaner bolts.

2.3.4 PERFORMANCE REQUIREMENTS

2.3.4.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Tests shall be of manufacturer's largest standard size, of standard construction, and at least 5'6" wide by 10'0" high.

A.—Horizontal Load Test. A concentrated load of 40 pounds, acting horizontally and applied at the center of the span of any horizontal sash rail, shall not cause, before the sash are glazed, a horizontal deflection of more than 1/175 of its span and in no case shall the deflection exceed .312 inches.

B.—Vertical Load Test. A concentrated load of 40 pounds, acting vertically and applied at the center of the span of any horizontal sash rail, shall not cause, before the sash are glazed, a vertical deflection of more than 1/375 of its span and in no case shall the deflection exceed .188 inches.

C.—Uniform Load Test. Under a minimum exterior uniform load of 15 pounds per square foot no member in a completely assembled window without muntins, glazed, closed and locked, continuously supported around its outside perimeter and securely anchored, shall deflect more than 1/175 of its span.

NOTE: The span length of any horizontal sash member shall be considered as equal to the overall width of the sash provided for that size of window.

2.3.4.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed ½ cubic foot per minute per foot of crack length with sash in closed position and locked. The sash shall have been adjusted to operate in either direction with a force not exceeding 45 pounds after the sash is in motion. The nominal size of the window tested shall be 4'0" wide by 6'0" high or have a frame and integral sash perimeter equal thereto.

2.3.5 DRAWINGS and INSTALLATION DETAILS

Shop drawings shall be submitted, in triplicate, for approval. Drawings shall show elevations of windows, full-size sections of sash and frames, details of construction, hardware and methods of anchoring window frame in the opening.

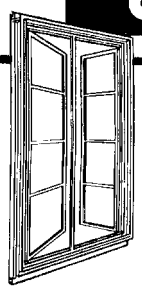
2.3.6 GLAZING

If bead glazed windows are specified, provision shall be made for the glass to be held in place by aluminum glazing beads, neatly fitted and securely attached to the sash members, and so constructed that the glass may be bedded in glazing compound on both sides of the glass.

The following companies manufacture a DH-A3 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

The Adams & Westlake Company, 1102 No. Michigan, Elkhart, Ind. *(Adlake, series 600, 700 and 800)*
Ceco Steel Products Corporation *(Sterling Aluminum Window Division)*
5601 West 26th St., Chicago 50, Ill. *(Series 300)*
Cupples Products Corp., 2650 So. Hanley Road, Maplewood, St. Louis 17, Mo. *(Series 500 and 490)*
General Bronze Corp. Stewart Ave., Garden City, N. Y. *(Permatite, series DHA-4 and DHA-5)*

SPECIFICATION
C-A1



CASEMENT WINDOWS
FOR RESIDENTIAL-TYPE BUILDINGS

(Section 1 in its entirety is a part of this specification.)

2.4.1 MATERIALS

Main frame and sash members, including sills, shall not be less than 0.062" in thickness. Detached hardware and hinges having component parts which are exposed shall be aluminum, non-magnetic stainless steel or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Plated or coated materials not compatible with aluminum are not permitted unless properly insulated from the aluminum.

2.4.2 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the operating units. Extension hinges, locking handles and roto-type operators shall be furnished unless otherwise specified.

WINDOWS

2.4.3 PERFORMANCE REQUIREMENTS

2.4.3.1 Physical Load Tests.

NOTE: Sample submitted for Physical Load Tests shall be of standard construction containing outswinging ventilators of manufacturer's largest standard size.

A.—Vertical Deflection Test of completely assembled window, ventilator without muntins, unglazed, with manufacturer's standard hardware. A concentrated load of 45 pounds, acting at the lower unrestrained corner of a ventilator opened 90° shall not cause a vertical deflection at the lower unrestrained corner greater than 1/2 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: Load of 45 pounds arbitrarily chosen to establish this standard test.

B.—Horizontal Deflection Test on ventilator installed in window frame, without muntins, unglazed, locking hardware in approximate center of ventilator side rail in locked position. A concentrated load of 20 pounds acting at either of the unrestrained corners of a ventilator shall not cause a deflection at the unrestrained corners greater than 3/8 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: Load of 20 pounds arbitrarily chosen to establish this standard test.

C.—Hardware Load Test on ventilators with hinges and roto-operating hardware. Standard window having two ventilators of manufacturer's largest standard size shall be securely fastened in the vertical plane so that when both ventilators are opened to their fullest extent they will be horizontal. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 45 miles per hour, and at the conclusion of the test the operators shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failure of screws, track or permanent deformation of arm allowed.

D.—Uniform Load Test on single and multiple window openings, glazed, closed and locked, supported continuously around outside perimeter and securely anchored. When subjected to an exterior uniform load of 10 pounds per square foot:

a. No member in a single window unit, including those consisting of a combination of vents, fixed side lights and/or transoms, shall deflect more than 1/175 of its span. Window tested shall be manufacturer's largest standard size.

b. No member, including horizontal and vertical mullions connecting single window units into multiple openings, shall deflect more than 1/175 of its span. All members in single units so combined must meet test described in paragraph (a) immediately above.

2.4.3.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed one cubic foot per minute per foot of crack length with ventilator in closed position and locked. The window tested shall have a nominal size of 3'0" x 4'0" and shall have two ventilators, each being of a nominal size of 1'6" x 4'0".

2.4.4 HOPPER AND TRANSOM VENTILATORS

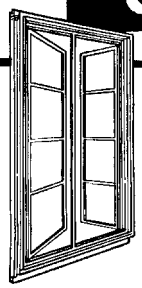
When used in combination with side-hinged ventilators as covered by this specification, hopper and/or transom ventilators shall be correlated with the provisions of Specification P-A1.

The following companies manufacture a C-A1 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

Alcasco Products Co., 1780 Creston cor. Laketon, Muskegon, Mich.
All-Lite Metal Window Co., Emilie Road & Green Lane, Bristol, Pa.
Aluminum Home Products Co., Carr St. & Southern Ry., Knoxville, Tenn.
Fentron Steel Works, Inc., 2801 Market St., Seattle 7, Wash.
Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. *(Lupton Residential Casement)*
General Bronze Corp. *(Alwintite Division)* Stewart Ave., Garden City, N. Y. *(Alwintite, series CPA-O)*
Metal Arts Mfg. Co., Inc., Harwell & Oakcliff Rd., Atlanta, Ga.
Reynolds Metals Corp. (Parts Division), 2000 S. 9th St., Louisville, Ky.
J. S. Thorn Co., Allegheny Ave., Philadelphia 32, Pa. *(Residence series)*
Timm Industries, Inc., 5245 W. San Fernando Road, Los Angeles 39, Cal. *(Series 17A-Ti)*
Universal Window Co., 950 Parker St., Berkeley 10, Cal. *(Series R400)*
Ware Laboratories, Inc., 3700 N. W. 25th St., Miami, Fla.

SPECIFICATION
C-A2

CASEMENT WINDOWS
FOR COMMERCIAL-TYPE BUILDINGS



(Section 1 in its entirety is a part of this specification.)

2.5.1 MATERIALS

Main frame and sash members, including sills, shall not be less than 0.062″ in thickness. Detached hardware, including hinges or sliding shoes, having component parts which are exposed, shall be of aluminum, non-magnetic stainless steel or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum.

2.5.2 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Extension hinges or sliding-type pivots, locking handles and roto-type operators shall be furnished unless otherwise specified.

2.5.3 PERFORMANCE REQUIREMENTS

2.5.3.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Tests shall be of standard construction containing outswinging ventilators of manufacturer's largest standard size.

A.—Vertical Deflection Test of completely assembled window, ventilator without muntins, unglazed, with manufacturer's standard hardware. A concentrated load of 60 pounds, acting at the lower unrestrained corner of a ventilator opened 90° shall not cause a vertical deflection at the lower unrestrained corner greater than 5/16 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: Load of 60 pounds arbitrarily chosen to establish this standard test.

B.—Horizontal Deflection Test on ventilator installed in window frame, without muntins, unglazed, locking hardware in approximate center of ventilator side rail in locked position. A concentrated load of 20 pounds acting at either of the unrestrained corners of a ventilator shall not cause a deflection at the unrestrained corners greater than 5/16 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: Load of 20 pounds arbitrarily chosen to establish this standard test.

C.—Hardware Load Test on ventilator with hinges and roto-operating hardware. Standard window having two ventilators of manufacturer's largest standard size shall be securely fastened in the vertical plane so that when both ventilators are opened to their fullest extent they will be horizontal. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 50 miles per hour, and at the conclusion of the test the operators shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failure of screws, track or permanent deformation of arm allowed.

D.—Uniform Load Test on unit consisting of frame and pair of ventilating sash, glazed, closed and locked. This unit which shall be manufacturer's largest standard size, is to be continuously supported around the outside perimeter and securely anchored. When subjected to a minimum exterior uniform load of 15 pounds per square foot, no member in this unit shall deflect more than 1/175 of its span.

NOTE: Due to the great variation of design and arrangements of ventilating units required by windows of this type and class, this uniform load test cannot be performed except on a standard unit such as that specified above. In order to insure uniformity of strength of all members required in any type of multiple unit opening, the manufacturer shall guarantee the use of a design for mullions, transom bars and other connecting members that will not permit a deflection greater than 1/175 of the span of any member under conditions simulating the load test described immediately above.

2.5.3.2 Air Infiltration Test

A.—Windows With Weatherstripping. When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed ½ cubic foot per minute per foot of crack length with ventilator in closed position and locked. The window tested shall be of a nominal size of 4′0″ x 6′0″ and shall have two ventilators, each being of a nominal size of 2′0″ x 6′0″. Ventilators shall be equipped with metal or other approved-type weatherstripping.

B.—Windows Without Weatherstripping. Where windows are specified to be of a design with two-point or three-point metal-to-metal contact without the use of auxiliary weatherstripping the air infiltration, when tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, shall not exceed one cubic foot per minute per foot of crack length with ventilator in closed position and locked. The window tested shall be of a nominal size of 4′0″ x 6′0″ and shall have two ventilators each being of a nominal size of 2′0″ x 6′0″.

2.5.4 HOPPER AND TRANSOM VENTILATORS

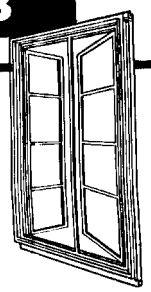
When used in combination with side-hinged ventilators as covered by this specification, hopper and/or transom ventilators shall be correlated with the provisions of Specification P-A2.

The following companies manufacture a C-A2 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

Fentron Steel Works, Inc., 2801 Market St., Seattle 7, Wash.
Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. *(Lupton Master Casement)*
General Bronze Corp., Stewart Ave., Garden City, N. Y. *(Permatite, series CPA-2)*
J. S. Thorn Co., Allegheny Ave., Philadelphia 32, Pa. *(Manor series)*

CASEMENT WINDOWS
FOR MONUMENTAL-TYPE BUILDINGS

SPECIFICATION **C-A3**



(Section 1 in its entirety is a part of this specification.)

NOTE: For C-A3 specification use C-A2 specification in its entirety and add the following paragraph under 2.5.3.1-D.

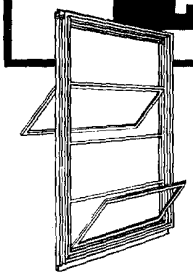
E.—Torsion Test on ventilator, without muntins, unglazed, supported on fulcrums, at diagonally opposite corners, with the corner diagonally opposite the loaded corner secured in the same plane by fulcrum support block and clamp. A concentrated load of 20 pounds acting at the unrestrained corner of the ventilator shall not cause a deflection at the unrestrained corner greater than 1½″.

NOTE: Load of 20 pounds arbitrarily chosen to establish this standard test.

The following companies manufacture a C-A3 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

Fentron Steel Works, Inc., 2801 Market St., Seattle 7, Wash.
General Bronze Corp., Stewart Ave., Garden City, N. Y. *(Permatite, series CPA-2)*

SPECIFICATION
P-A1



PROJECTED WINDOWS
FOR RESIDENTIAL-TYPE BUILDINGS

(Section 1 in its entirety is a part of this specification.)

2.7.1 MATERIALS

Main frame and sash members, including sills, shall not be less than 0.062" in thickness. Detached hardware and sliding shoes having component parts which are exposed shall be aluminum, non-magnetic stainless steel, or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum.

2.7.2 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Ventilators shall have balance arms to position the ventilator with built-in sliding friction pivots having springs and non-abrasive shoes. Detached hardware shall consist of locking handle for manual operation as standard or spring catch for pole operation where required.

2.7.3 PERFORMANCE REQUIREMENTS

2.7.3.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Tests shall be of standard construction containing projected-out ventilator of manufacturer's largest standard size.

A.—Hardware Load Test on unglazed window with projected-out ventilator open to 45°, securely clamped and continuously supported around the outside perimeter, one free corner of the open ventilator securely held in the 45° position by blocking between the corner of the ventilator and the fixed portion of the window. A concentrated load of 17 pounds acting from the outside, perpendicular to the plane of the fixed portion and applied to the free rail of the ventilator at the point of locking handle attachment, shall not cause a deflection at the free corner opposite the blocked corner, measured perpendicular to plane of the fixed portion, greater than 3½".

B.—Uniform Load Test on complete unit. A glazed window with ventilator closed and locked shall be continuously supported around the outside perimeter and securely anchored. When subjected to an exterior uniform load of 10 pounds per square foot, applied perpendicular to and on the surface corresponding to the outside of the window, no member of a window unit or vertical or horizontal mullions, shall deflect more than 1/175 of its span.

2.7.3.2 Air Infiltration Test

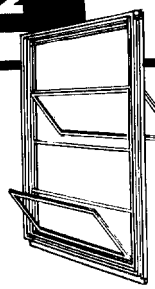
When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed one cubic foot per minute per foot of crack length with ventilator in closed position and locked. The nominal size of the ventilators of the window tested shall be approximately 3'0" wide by 2'0" high.

The following companies manufacture a P-A1 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

All-Lite Metal Window Co., Emilie Road & Green Lane, Bristol, Pa.
The Wm. Bayley Co., 1200 Warder St., Springfield 99, Ohio
Cupples Products Corp., 2650 So. Hanley Road, Maplewood, St. Louis 17, Mo. *(Series 700)*
Fentron Steel Works, Inc., 2801 Market St., Seattle 7, Wash.
J. S. Thorn Co., Allegheny Ave., Philadelphia 32, Pa.
Universal Window Co., 950 Parker St., Berkeley 10, Cal. *(Series S-300)*
Ware Laboratories, Inc., 3700 N.W. 25th St., Miami, Fla.

PROJECTED WINDOWS
FOR COMMERCIAL- and MONUMENTAL-TYPE BUILDINGS

SPECIFICATION
P-A2



(Section 1 in its entirety is a part of this specification.)

2.8.1 MATERIALS

Main frame and sash members, including sills, shall not be less than 0.062" in thickness. Detached hardware and sliding shoes having component parts which are exposed shall be aluminum, non-magnetic stainless steel, or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum.

2.8.2 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Ventilators shall have balance arms to position the ventilator with built-in sliding friction pivots having springs and non-abrasive shoes. Detached hardware shall consist of one locking handle for manual operation as standard or spring catch for pole operation where required.

2.8.3 PERFORMANCE REQUIREMENTS

2.8.3.1 Physical Load Tests

NOTE: *Samples submitted for Physical Load Test shall be of standard construction containing projected-out ventilator of manufacturer's largest standard size.*

A.—Hardware Load Test on unglazed window with projected-out ventilator open to 45°, securely clamped and continuously supported around the outside perimeter, one free corner of the open ventilator securely held in the 45° position by blocking between the corner of the ventilator and the fixed portion of the window. A concentrated load of 30 pounds acting from the outside, perpendicular to the plane of the fixed portion and applied to the free rail of the ventilator at the point of locking handle attachment, shall not cause a deflection at the free corner opposite the blocked corner, measured perpendicular to plane of fixed portion, greater than 3½".

B.—Uniform Load Test on complete unit. A glazed window with ventilator closed and locked shall be continuously supported around the outside perimeter and securely anchored. When subjected to an exterior uniform load of 15 pounds per square foot, applied perpendicular to and on the surface corresponding to the outside of the window, no member of a window unit or vertical or horizontal mullions, shall deflect more than 1/175 of its span.

2.8.3.2 Air Infiltration Test

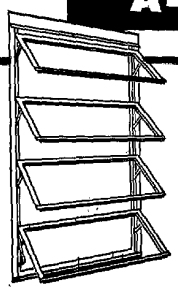
When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed one cubic foot per minute per foot of crack length with ventilator in closed position and locked. The nominal size of the ventilators of the window tested shall be approximately 4'0" wide by 2'8" high.

The following companies manufacture a P-A2 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

The Wm. Bayley Co., 1200 Warder St., Springfield 99, Ohio
Cupples Products Corp., 2650 So. Hanley Road, Maplewood, St. Louis 17, Mo. *(Series 700)*
Fentron Steel Works, Inc., 2801 Market St., Seattle 7, Wash.
Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. *(Lupton, Master Proj.)*
General Bronze Corp., Stewart Ave., Garden City, N. Y. *(Permatite, series CPA-2 Proj.)*
J. S. Thorn Co., Allegheny Ave., Philadelphia 32, Pa. *(Intermediate series)*
Universal Window Co., 950 Parker St., Berkeley 10, Cal. *(Series M-200)*

SPECIFICATION
A-A1

AWNING WINDOWS
FOR RESIDENTIAL-TYPE BUILDINGS



(Section 1 in its entirety is a part of this specification.)

2.9.1 GENERAL

Awning windows are those windows consisting of a multiplicity of top-hinged ventilators arranged in a vertical series and operated by one or more control devices which swing the bottom edges of the ventilators outward. The hinges may be sliding or fixed. The ventilators may be operated simultaneously, in sequence or individually. The ventilators may close and weather on themselves or on independent meeting rails assembled as part of the window frame. There may or may not be fixed glass units between the ventilators.

2.9.2 MATERIALS

Main frame and sash members, including sills, shall not be less than 0.062″ in thickness. Detached hardware and sliding shoes having component parts which are exposed shall be aluminum, non-magnetic stainless steel, or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum.

2.9.3 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Detached hardware shall consist of roto-type operator for crank type operation or locking handle for manual operation of ventilators in unison or sequence, or push bars for manual, individual operation of ventilators.

2.9.4 PERFORMANCE REQUIREMENTS

2.9.4.1 Physical Load Tests

NOTE: Sample window submitted for Physical Load Tests shall be of standard construction of manufacturer's largest standard size containing maximum number of largest standard size ventilators.

A.—Horizontal Deflection Test on ventilators installed in window frame, closed and locked, without muntins, unglazed. A concentrated load of 20 pounds acting individually on each lower corner of all ventilators shall not cause a deflection at the corner greater than 3/8 inches, and at the conclusion of the test the ventilators shall properly close and operate.

NOTE: Load of 20 pounds arbitrarily chosen to establish this standard test.

B.—Hardware Load Test on ventilators. Standard window having ventilators of manufacturer's largest standard size shall be securely mounted in such a position that when ventilators are opened to their fullest extent they will be horizontal. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 45 miles per hour, and at the conclusion of the test the operators shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failure of screws, hardware parts or permanent deformation of arm allowed.

C.—Uniform Load Test on complete unit. A glazed window with ventilators closed and locked shall be continuously supported around the outside perimeter and securely anchored. When subjected to an exterior uniform load of 10 pounds per square foot, applied perpendicular to and on the surface corresponding to the outside of the window, no member of a window unit or vertical or horizontal mullions, shall deflect more than 1/175 of its span.

2.9.4.2 Air Infiltration Test

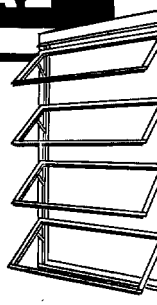
When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed one cubic foot per minute per foot of crack length with ventilators in closed position and locked. The window tested shall be of a nominal size of 3′0″ wide x 4′0″ high and shall be 100% ventilated, using manufacturer's standard ventilator arrangement.

The following companies manufacture an A-A1 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

All-Lite Metal Window Co., Emilie Road & Green Lane, Bristol, Pa.
Fentron Steel Works, Inc., 2801 Market St., Seattle 7, Wash.
General Bronze Corp., *(Alwintite Division)*, Stewart Ave., Garden City, N. Y.
Ludman Corporation, 21 N.W. 21st Street, Miami, Florida
Miami Window Corp., 5200 N.W. 37th Ave., Miami 42, Fla.
Reynolds Metals Co. (Parts Division), 2000 S. 9th St., Louisville, Ky.
Universal Window Co., 950 Parker St., Berkeley 10, Cal. *(Series S-300)*
Ware Laboratories, Inc., 3700 N.W. 25th St., Miami, Fla.

AWNING WINDOWS
FOR COMMERCIAL- AND MONUMENTAL-TYPE BUILDINGS

SPECIFICATION A-A2



(Section 1 in its entirety is a part of this specification.)

2.10.1 GENERAL

Awning windows are those windows consisting of a multiplicity of top-hinged ventilators arranged in a vertical series and operated by one or more control devices which swings the bottom edges of the ventilators outward. The hinges may be sliding or fixed. The ventilators may be operated simultaneously, in sequence or individually. The ventilators may close and weather on themselves or on independent meeting rails assembled as part of the window frame. There may or may not be fixed glass units between the ventilators.

2.10.2 MATERIALS

Main frame and sash members, including sills, shall not be less than 0.062" in thickness. Detached hardware and sliding shoes having component parts which are exposed shall be aluminum, non-magnetic stainless steel, or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum.

2.10.3 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Detached hardware shall consist of roto-type operator for crank type operation or locking handle for manual operation of ventilators in unison or sequence, or push bars for manual, individual operation of ventilators.

2.10.4 PERFORMANCE REQUIREMENTS

2.10.4.1 Physical Load Tests

NOTE: Sample window submitted for Physical Load Tests shall be of standard construction of manufacturer's largest standard size containing maximum number of largest standard size ventilators.

A.—Horizontal Deflection Test on ventilators installed in window frame, closed and locked, without muntins, unglazed. A concentrated load of 20 pounds acting individually on each lower corner of all ventilators shall not cause a deflection at the corner greater than 5/16 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: Load of 20 pounds arbitrarily chosen to establish this standard test.

B.—Hardware Load Test on ventilators. Standard window having ventilators of manufacturer's largest standard size shall be securely mounted in such a position that when the ventilators are opened to their fullest extent they will be horizontal. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 50 miles per hour, and at the conclusion of the test the operators shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failure of screws, hardware parts, track or permanent deformation of arm allowed.

C.—Uniform Load Test on complete unit. A glazed window with ventilators closed and locked shall be continuously supported around the outside perimeter and securely anchored. When subjected to an exterior uniform load of 15 pounds per square foot, applied perpendicular to and on the surface corresponding to the outside of the window, no member of a window unit or vertical or horizontal mullions, shall deflect more than 1/175 of its span.

NOTE: Due to the great variation of design and arrangements of ventilating units required by windows of this type and class, this uniform load test cannot be performed except on a standard unit such as that specified above. In order to insure uniformity of strength of all members required in any type of multiple unit opening, the manufacturer shall guarantee the use of a design for mullions, transom bars and other connecting members that will not permit a deflection greater than 1/175 of the span of any member under conditions simulating the load test described immediately above.

2.10.4.2 **Air Infiltration Test**

A.—Windows With Weatherstripping. When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed ½ cubic foot per minute per foot of crack length with ventilators in closed position and locked. The window tested shall be of a nominal size of 4'0" wide x 5'6" high and shall be 100% ventilated, using manufacturer's standard ventilator arrangement. Ventilators shall be equipped with metal or other approved-type weatherstripping.

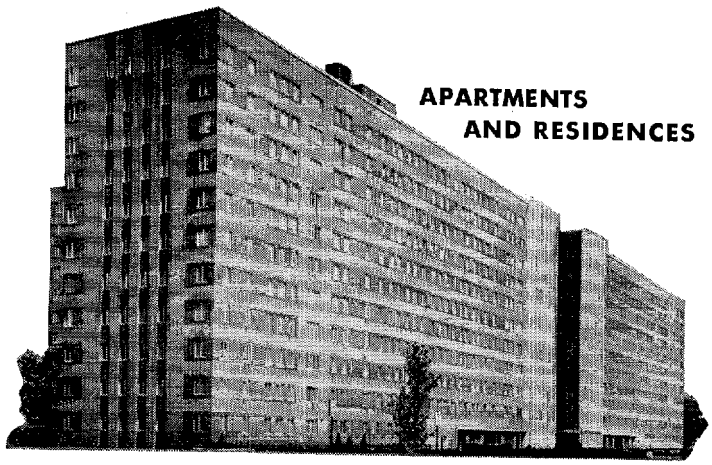
B.—Windows Without Weatherstripping. Where windows are specified to be of a design with two-point or three-point metal-to-metal contact without the use of auxiliary weatherstripping the air infiltration, when tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, shall not exceed one cubic foot per minute per foot of crack length with ventilators in closed position and locked. The window tested shall be of a nominal size of 4'0" wide x 5'6" high and shall be 100% ventilated, using manufacturer's standard ventilator arrangement.

The following companies manufacture an A-A2 type window which meets these specifications and are eligible to display the "Quality-Approved" Seal.

The Wm. Bayley Co., 1200 Warder St., Springfield 99, Ohio
Fentron Steel Works, Inc., 2801 Market St., Seattle 7, Wash.
Ludman Corporation, 21 N.W. 21st Street, Miami, Florida
Miami Window Corp., 5200 N.W. 37th Ave., Miami 42, Fla.
J. S. Thorn Co., Allegheny Ave., Philadelphia 32, Pa. *(Hospital Type)*
Universal Window Co., 950 Parker St., Berkeley 10, Cal. *(Series M-200)*
Ware Laboratories, Inc., 3700 N. W. 25th St., Miami, Fla.

FOR ANY TYPE BUILDING SPECIFY QUALITY-APPROVED ALUMINUM WINDOWS

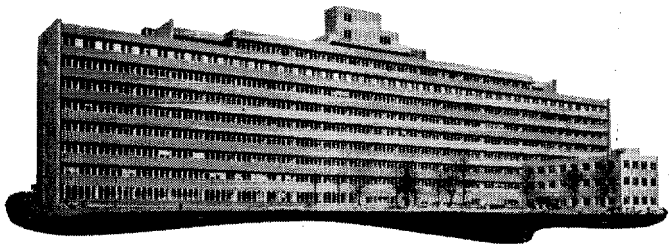
APARTMENTS AND RESIDENCES



Twin Oaks Apartments, Kansas City, Mo.
Architects: Voskamp & Slezak

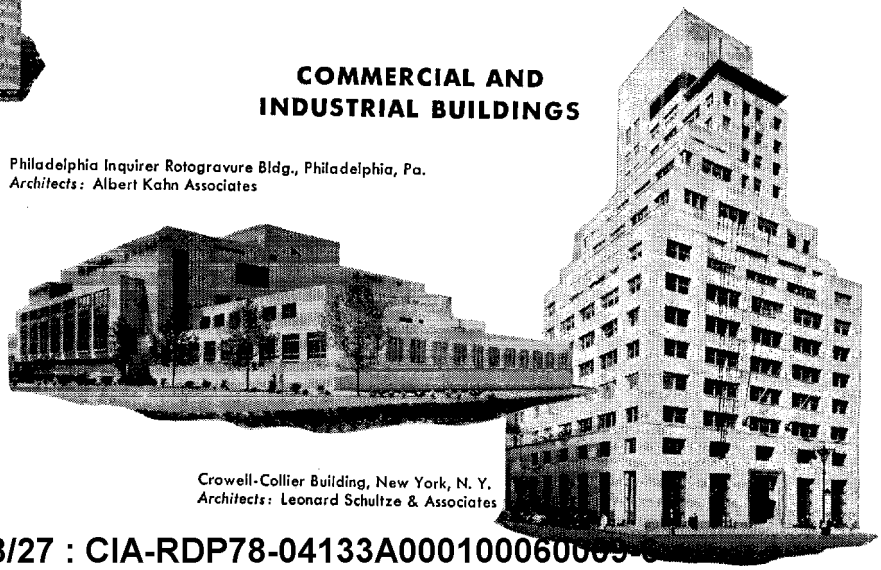
HOSPITALS

Veterans Administration Hospital, Seattle, Wash.
Architects: Naramore, Bain, Brady & Johanson
Contractor: Sound Constr. & Engr. Co.



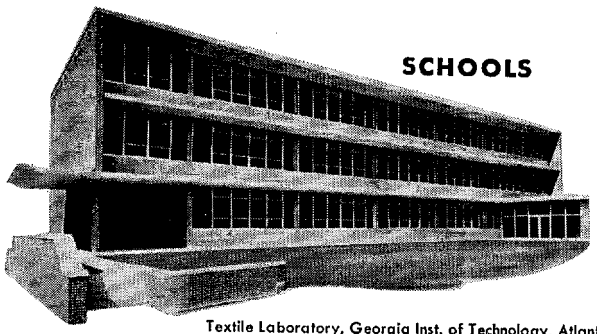
COMMERCIAL AND INDUSTRIAL BUILDINGS

Philadelphia Inquirer Rotogravure Bldg., Philadelphia, Pa.
Architects: Albert Kahn Associates



Crowell-Collier Building, New York, N. Y.
Architects: Leonard Schultze & Associates

SCHOOLS

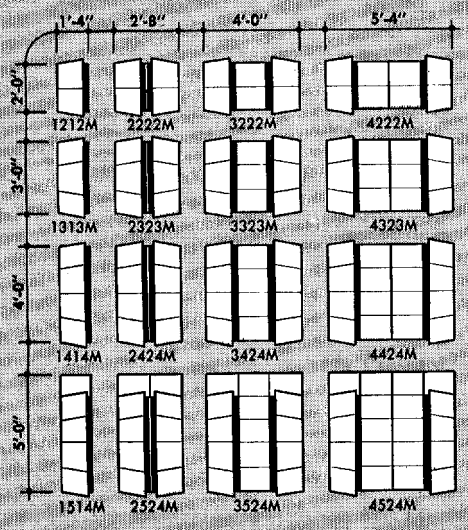


Textile Laboratory, Georgia Inst. of Technology, Atlanta, Ga.
Architects: Bush, Brown, Gailey, Heffernan

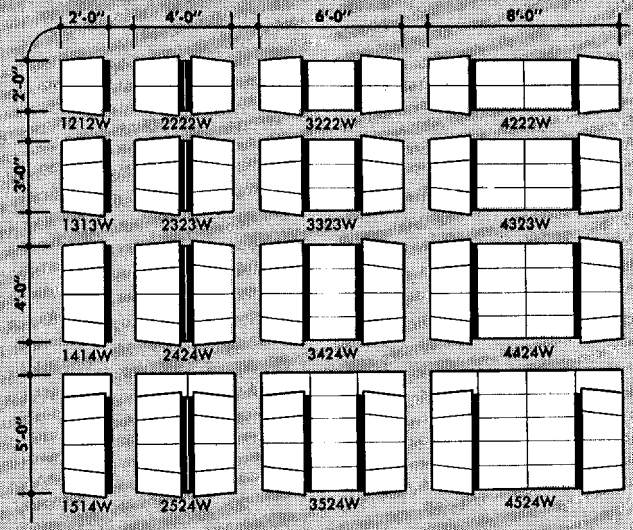
WINDOWS

C-A1 CASEMENT WINDOWS for residential-type buildings

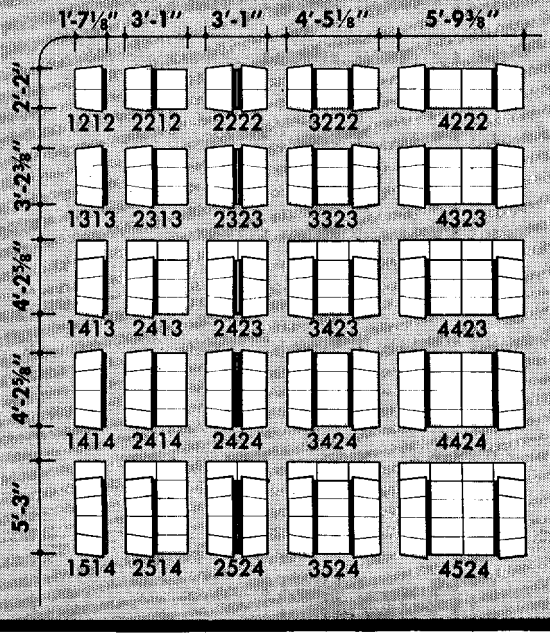
A.W.M.A. MODULAR



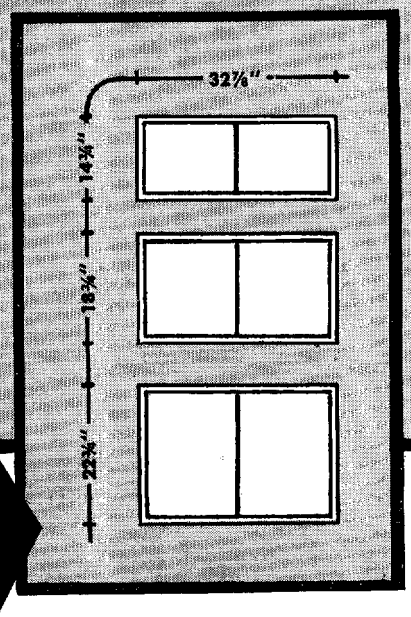
A.W.M.A. WESTERN MODULAR



A.W.M.A. STANDARD

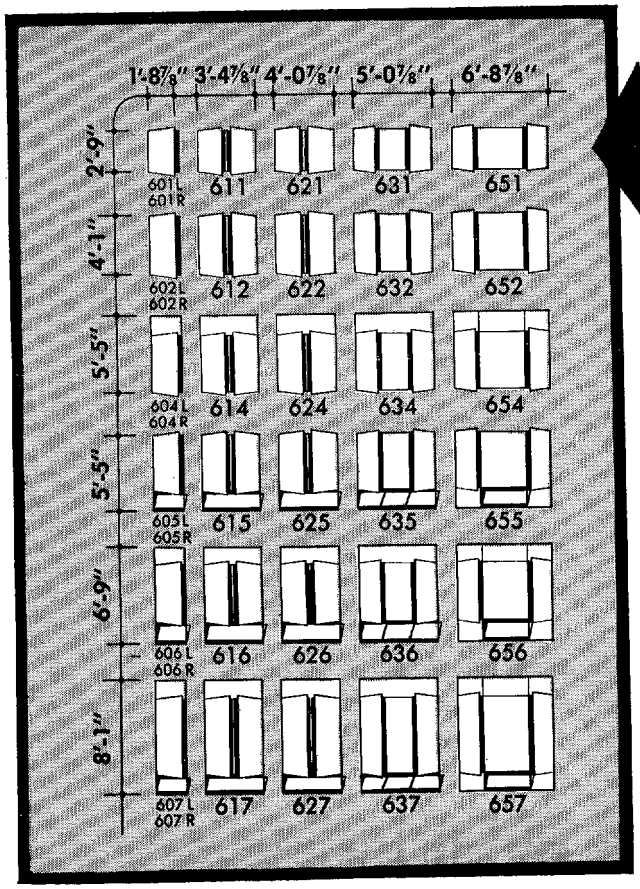


Dimensions shown are window dimensions.
Units with single ventilator may be hinged either right or left.
Fixed types furnished for all sizes shown.



BASEMENT WINDOWS

ALUMINUM



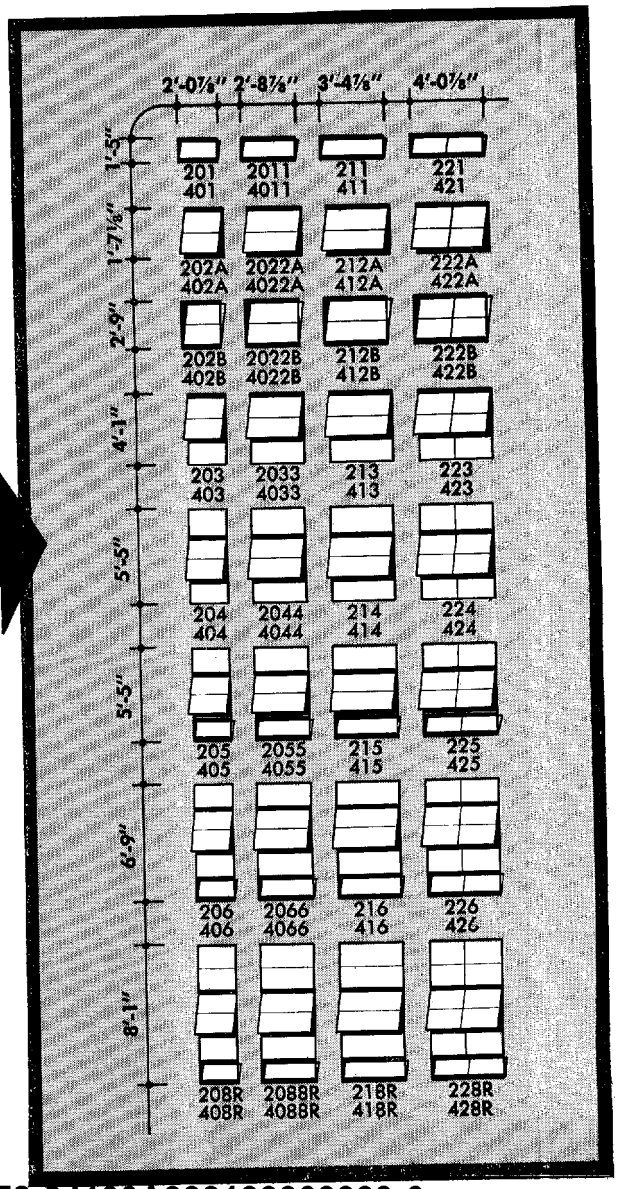
C-A2 and C-A3 CASEMENT WINDOWS for commercial and monumental-type buildings.

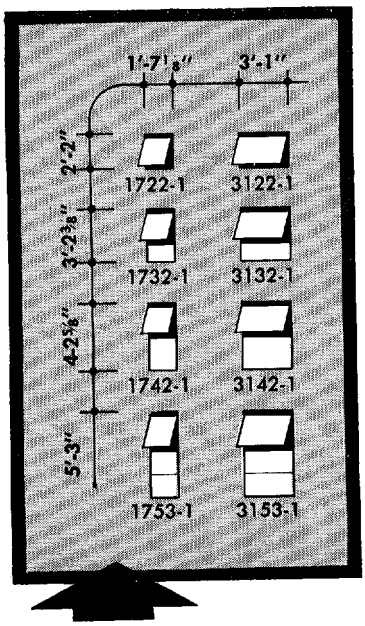
Dimensions shown are window opening dimensions.

Horizontal and/or vertical muntins may be added if desired, provided they are based on 20" or 24" bar centers for width and 16" bar centers for height.

Fixed light may be provided at sill in place of sill vents.

Fixed types furnished for all sizes shown.





P-A2 PROJECTED WINDOWS for commercial and monumental-type buildings.

Dimensions shown are window opening dimensions.

All vents shown to project out may be made to project in, provided all vents in the same unit project in.

200 series indicates architectural projected.

400 series indicates intermediate projected.

Vertical muntins may be added to 200 and 400 series windows if desired, provided they are based on 20" or 24" bar centers.

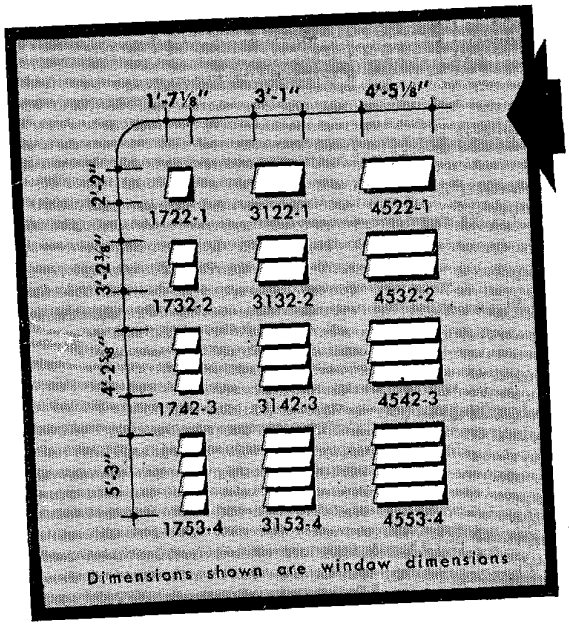
Fixed types furnished for all sizes shown.

P-A1 PROJECTED WINDOWS for residential-type buildings.

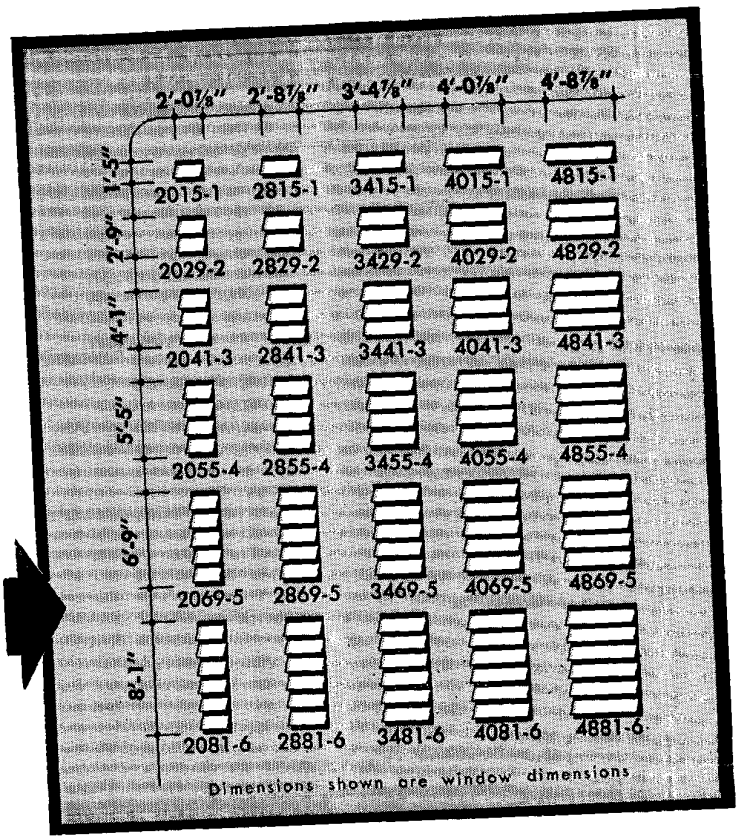
Dimensions shown are window opening dimensions.

WINDOWS

standard sizes



A-A1 AWNING WINDOWS for residential-type buildings.



A-A2 AWNING WINDOWS for commercial and monumental-type buildings.

DOUBLE-HUNG WINDOWS (DH-A1, DH-A2 and DH-A3) for residential, commercial and monumental-type buildings.

See manufacturers' catalogs for available sizes.

PICTURE or PANORAMA WINDOWS

Most manufacturers of aluminum double-hung, casement, projected and awning windows offer picture or panorama windows in heights and widths that complement their standard sizes. These windows accommodate either ¼" plate glass or 1" double glass of the "Thermopane" or "Twindow" type. See manufacturers' catalogs for available sizes.

members

THE ADAMS & WESTLAKE COMPANY
Elkhart, Indiana

ALCASCO PRODUCTS, INC.
Muskegon, Michigan

ALL-LITE METAL WINDOW CO.
Bristol, Pennsylvania

ALSCO, INC.
Akron, Ohio

ALUMINUM HOME PRODUCTS CO.
Knoxville, Tennessee

THE WM. BAYLEY COMPANY
Springfield, Ohio

CECO STEEL PRODUCTS CORPORATION
Sterling Aluminum Window Division
Chicago, Illinois

CUPPLES PRODUCTS CORPORATION
St. Louis, Missouri

FENTRON STEEL WORKS, INC.
Seattle, Washington

MICHAEL FLYNN MFG. CO.
Philadelphia, Pennsylvania

GENERAL BRONZE CORPORATION
and its ALWINTITE DIVISION
Garden City, N. Y.

LUDMAN CORPORATION
Miami, Florida

METAL ARTS MFG. CO., INC.
Atlanta, Georgia

MIAMI WINDOW CORPORATION
Miami, Florida

REYNOLDS METALS COMPANY
Parts Division
Louisville, Kentucky

J. S. THORN COMPANY
Philadelphia, Pennsylvania

TIMM INDUSTRIES, INC.
Los Angeles, California

UNIVERSAL WINDOW CO.
Berkeley, California

WARE LABORATORIES, INC.
Miami, Florida

WINDALUME CORPORATION
Kenvil, New Jersey

QUALITY APPROVED

Aluminum Window Manufacturers Association
74 Trinity Place New York 6, N. Y.